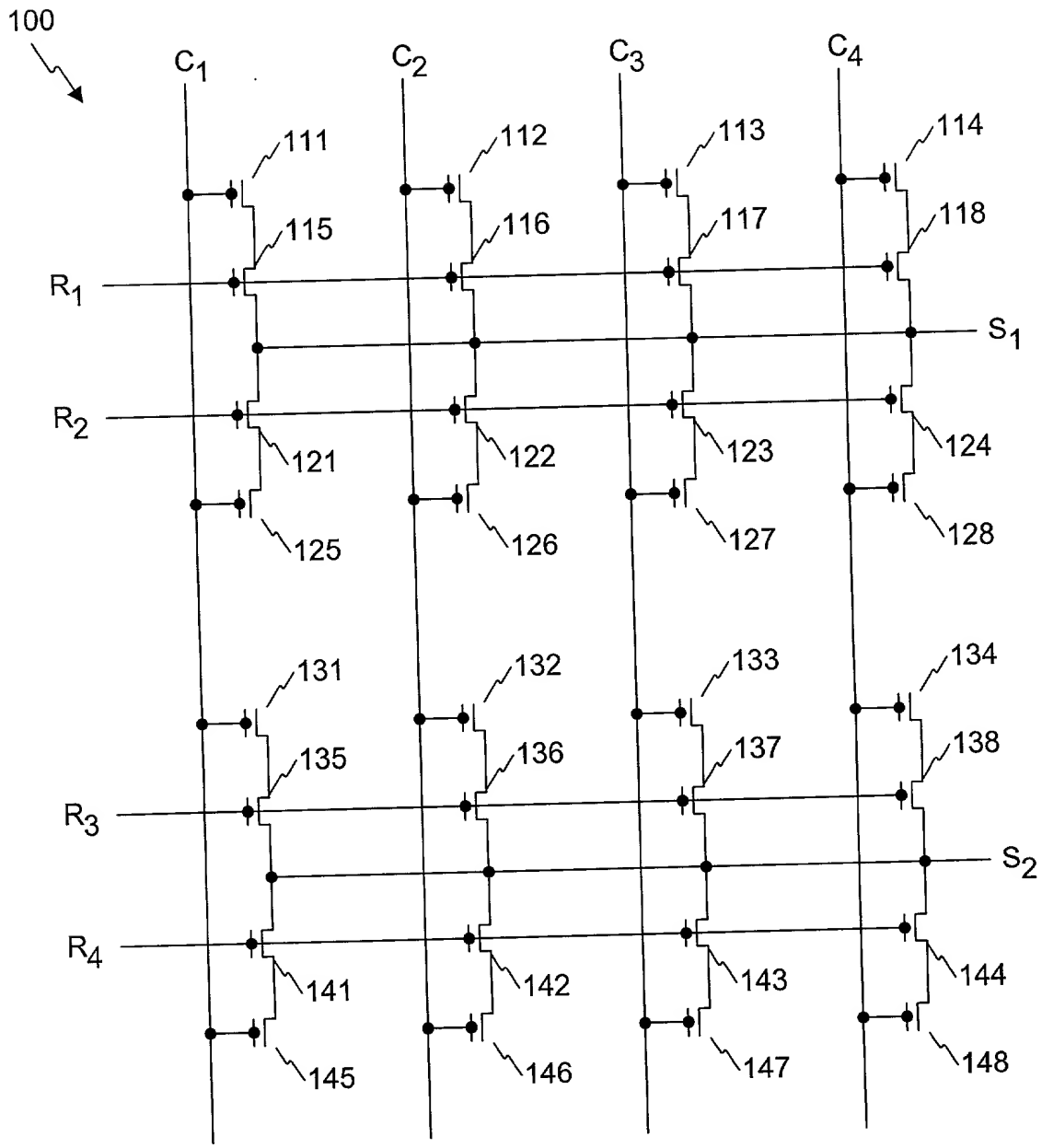
100
C1
C2
C3
C4
111
112
113
114
115
116
117
118
R1
S1
R2
121
122
123
124
125
126
127
128
131
132
133
134
135
136
137
138
R3
S2
R4
141
142
143
144
145
146
147
148

FIG. 1

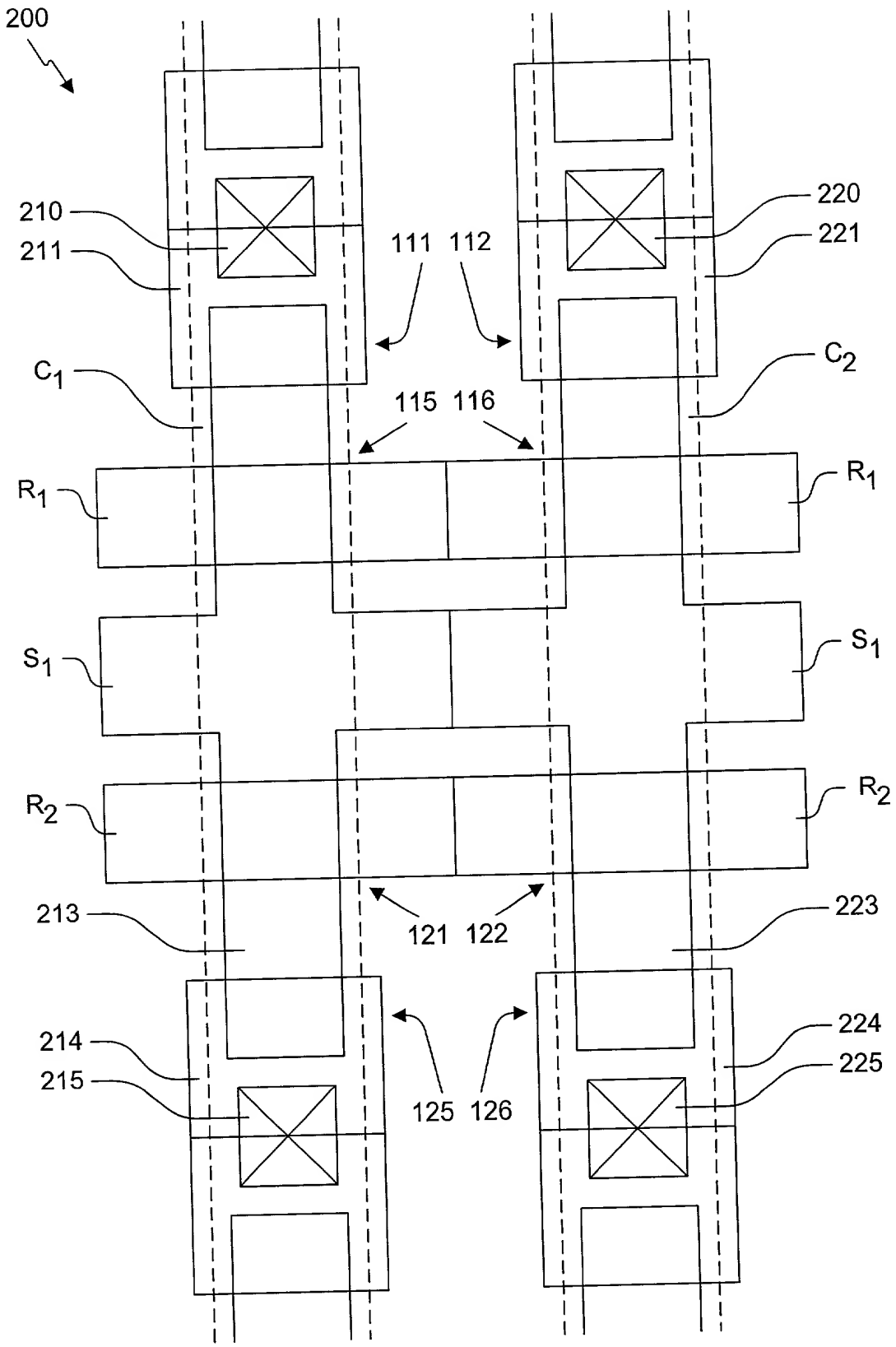
200
210
211
111
112
220
221
C1
C2
115
116
R1
R1
S1
S1
R2
R2
213
121
122
223
214
215
125
126
224
225

FIG. 2

TOBT60" Th955660

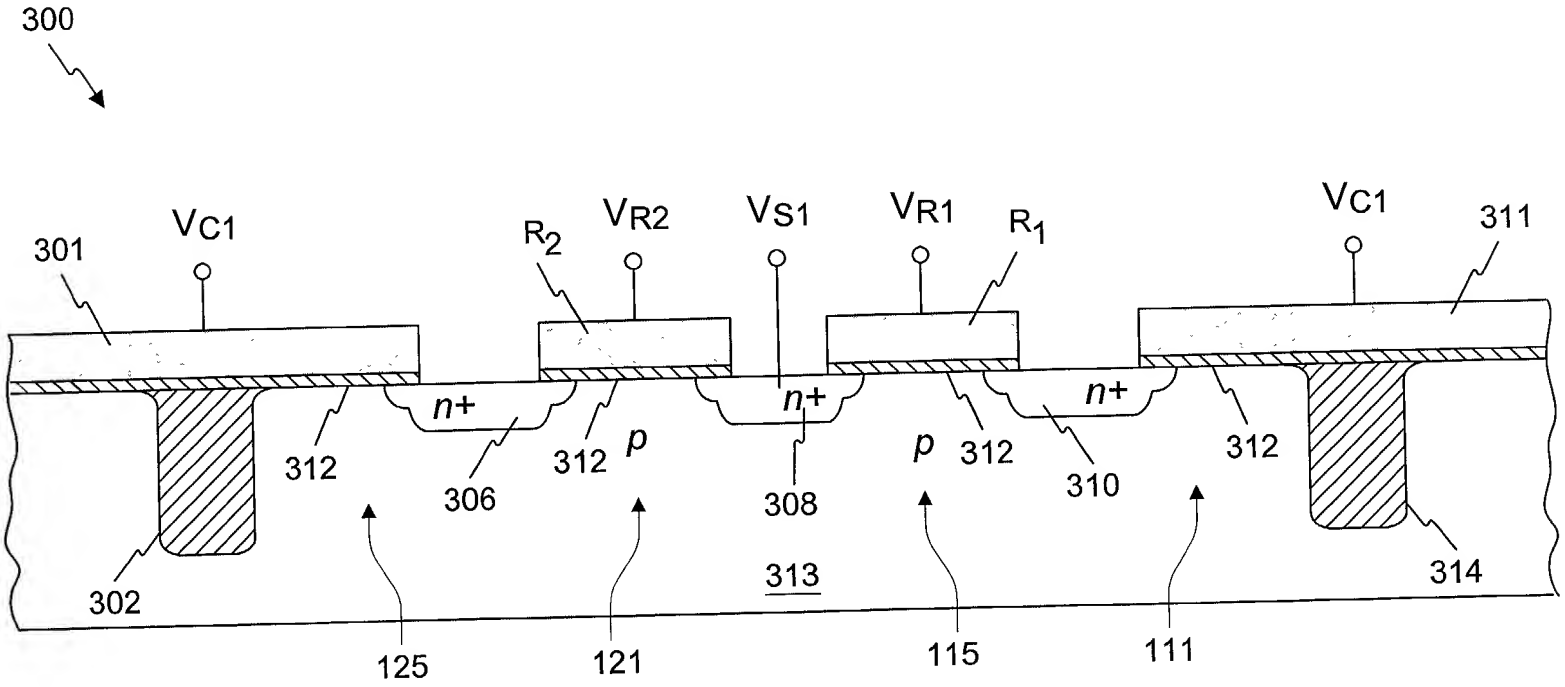

FIG. 3

TOSTEO" Th95560

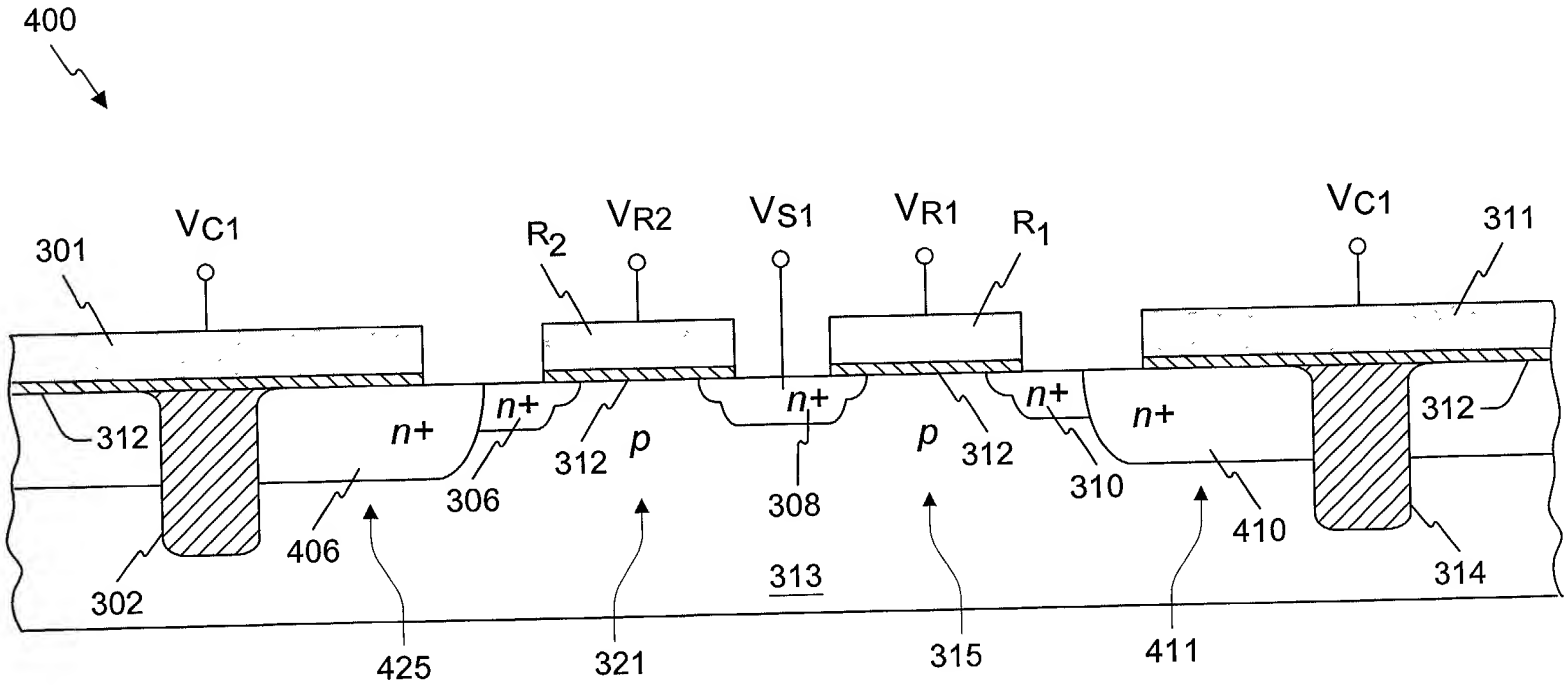

FIG. 4

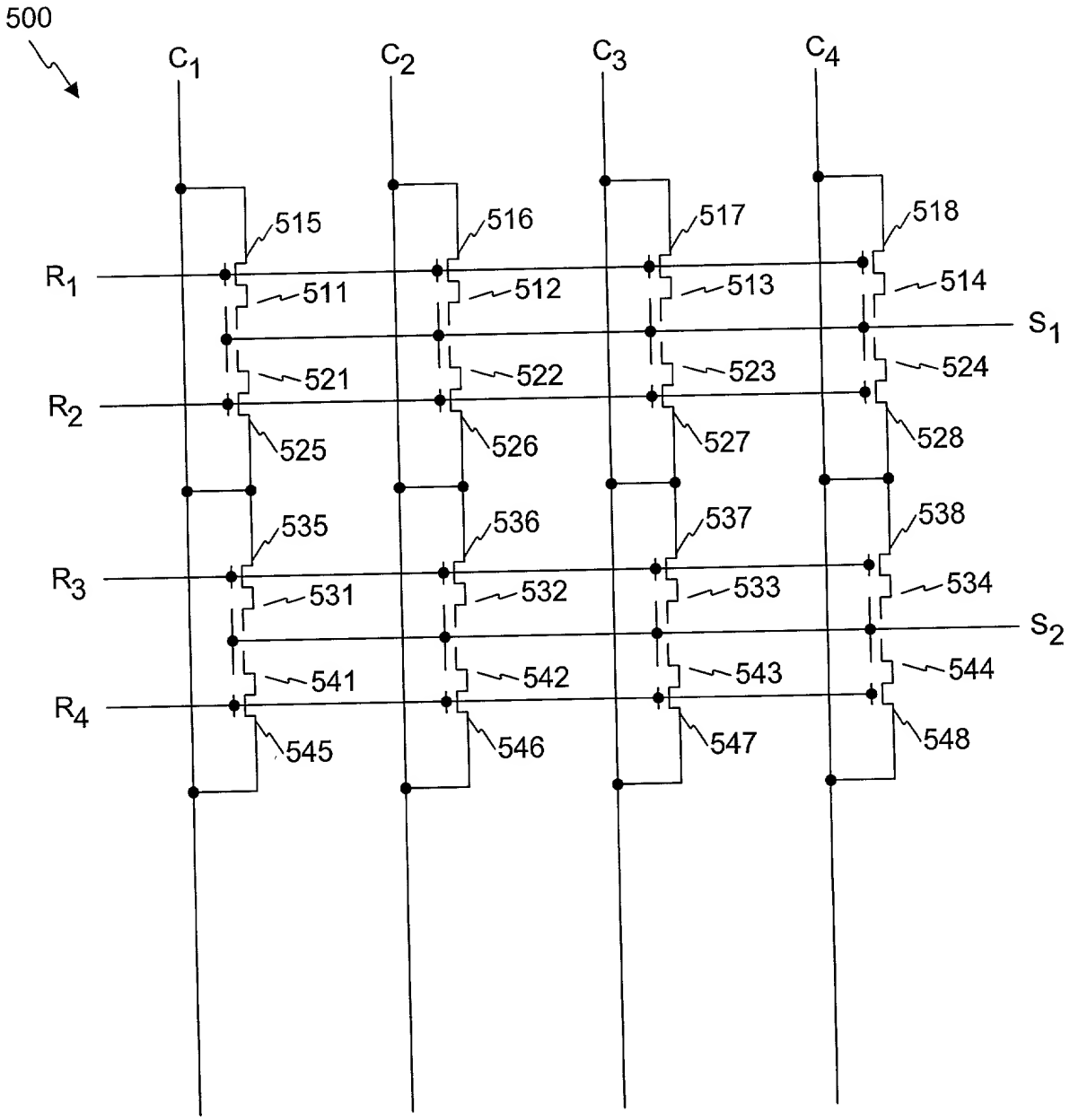
500
C1
C2
C3
C4
R1
R2
R3
R4
S1
S2
511
512
513
514
515
516
517
518
521
522
523
524
525
526
527
528
531
532
533
534
535
536
537
538
541
542
543
544
545
546
547
548

FIG. 5

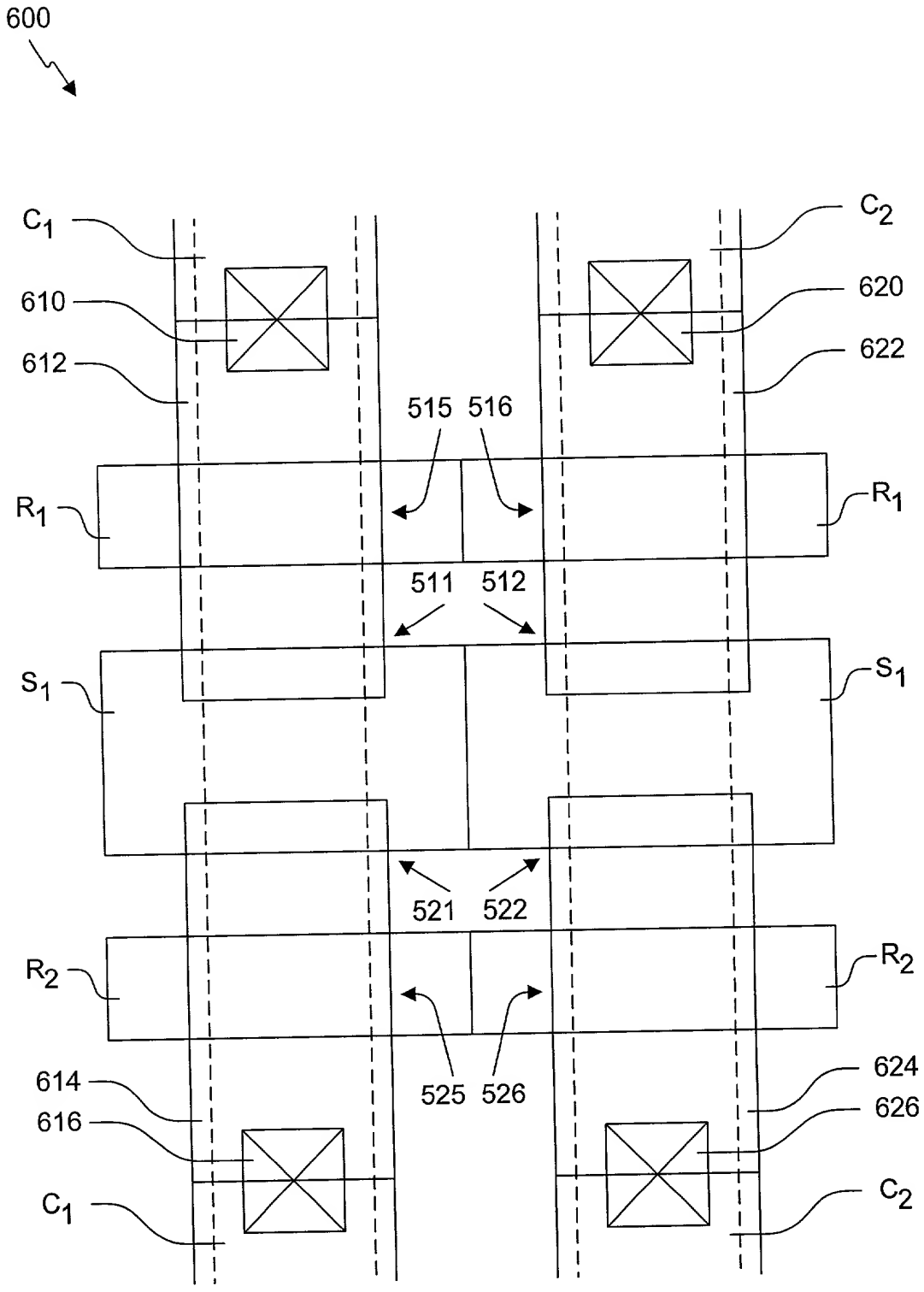
600
C1
C2
610
620
612
622
515 516
R1
R1
511 512
S1
S1
521 522
R2
R2
614
624
616
626
525 526
C1
C2

FIG. 6

TOSTEO" TH9559E0

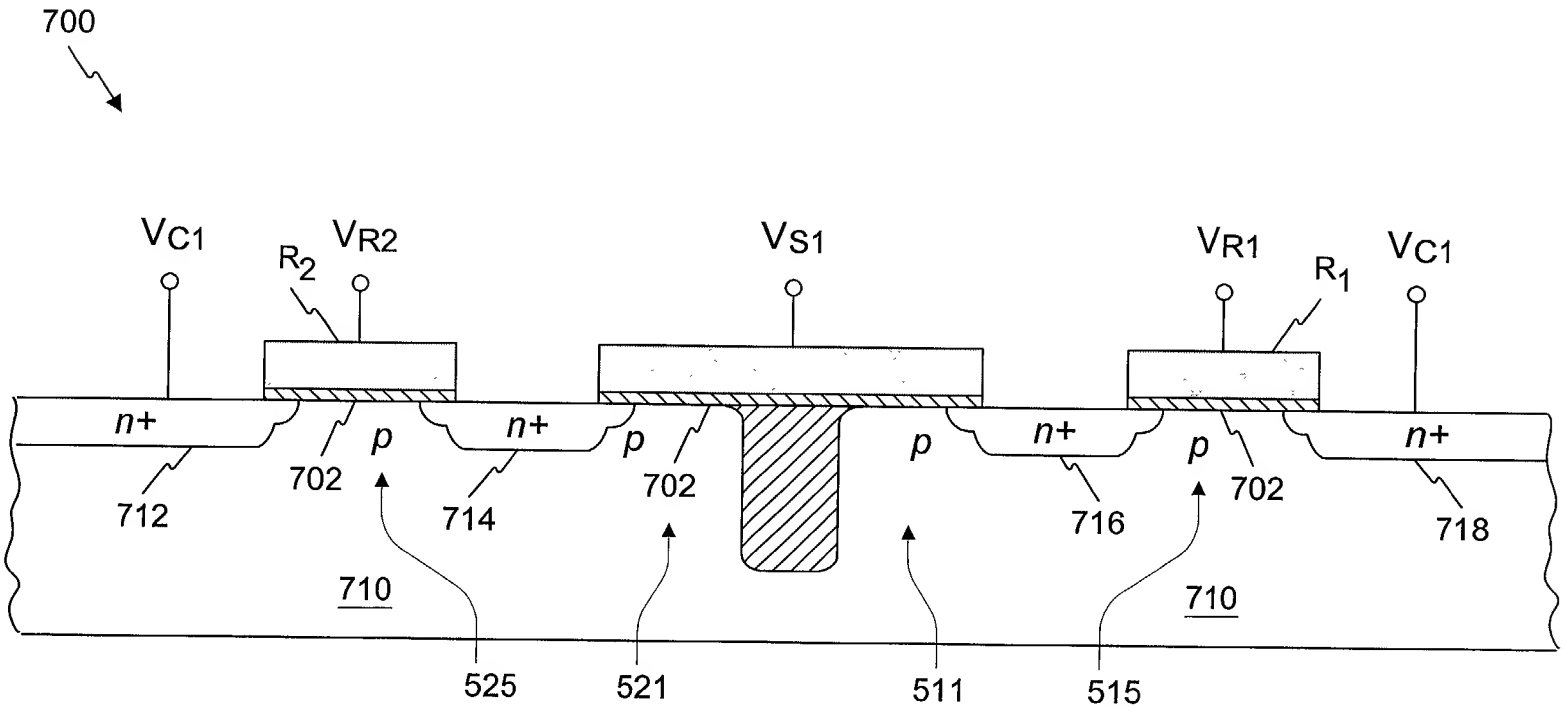

FIG. 7

T08T60" Th95S660

	OPERATION	R/C SELECT STATUS	V ROW	V COLUMN	V SOURCE	V OXIDE	RESULT
801 →	PROGRAM	SR/SC	2.5	7.0	0	7.0	PROGRAM
802 →		SR/UC	2.5	0	0	0	NO CHANGE
803 →		UR/SC	0	7.0	0	< 4	NO CHANGE
804 →		UR/UC	0	0	0	0	NO CHANGE
805 →	READ	SR/SC	2.5	1.5	0		CURRENT SENSED
806 →		SR/UC	2.5	0	0		NO CURRENT
807 →		UR/SC	0	1.5	0		NO CURRENT
808 →		UR/UC	0	0	0		NO CURRENT

FIG. 8

	OPERATION	R/C SELECT STATUS	V ROW	V COLUMN	V SOURCE	V OXIDE	RESULT
901 →	PROGRAM	SR/SC	7.0	7.0	0	6.6	PROGRAM
902 →		SR/UC	7.0	0	0	0	NO CHANGE
903 →		UR/SC	0	7.0	0	< 4.0	NO CHANGE
904 →		UR/UC	0	0	0	0	NO CHANGE
905 →	READ	SR/SC	2.5	1.5	0		CURRENT SENSED
906 →		SR/UC	2.5	0	0		NO CURRENT
907 →		UR/SC	0	1.5	0		NO CURRENT
908 →		UR/UC	0	0	0		NO CURRENT

FIG. 9

	OPERATION	R/C SELECT STATUS	V ROW	V COLUMN	V SOURCE	V OXIDE	RESULT
1001 →	PROGRAM	SR/SC	2.5	2.5	- 4.5	6.6	PROGRAM
1002 →		SR/UC	2.5	0	- 4.5	4.0	NO CHANGE
1003 →		UR/SC	0	2.5	-4.5	< 4.0	NO CHANGE
1004 →		UR/UC	0	0	- 4.5	< 4.0	NO CHANGE
1005 →	READ	SR/SC	2.5	1.5	0		CURRENT SENSED
1006 →		SR/UC	2.5	0	0		NO CURRENT
1007 →		UR/SC	0	1.5	0		NO CURRENT
1008 →		UR/UC	0	0	0		NO CURRENT

FIG. 10

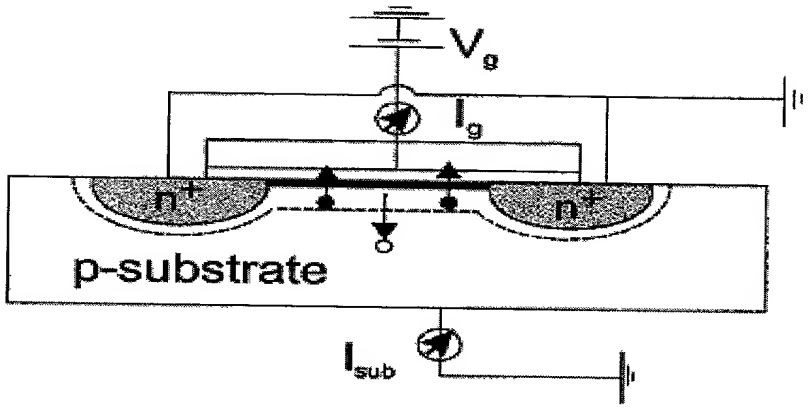
V_g
I_g
n^+
n^+
p-substrate
I_{sub}

FIG. 11

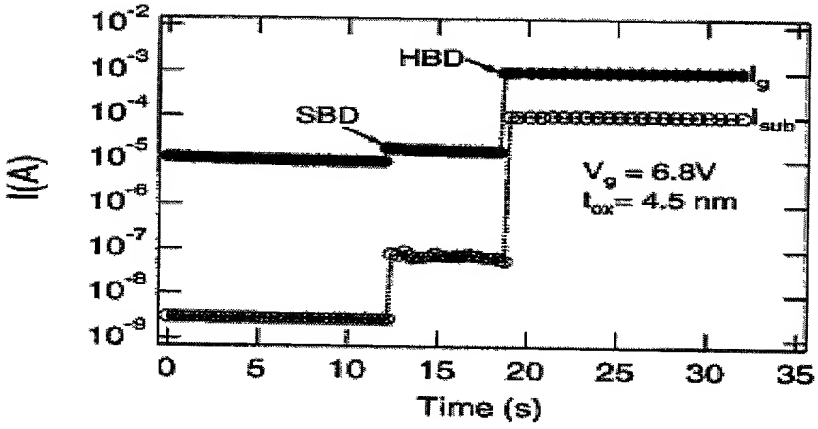
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
10^{-7}
10^{-8}
10^{-9}
I(A)
HBD
SBD
I_g
I_{sub}
V_g = 6.8V
t_{ox}= 4.5 nm
0
5
10
15
20
25
30
35
Time (s)

FIG. 12

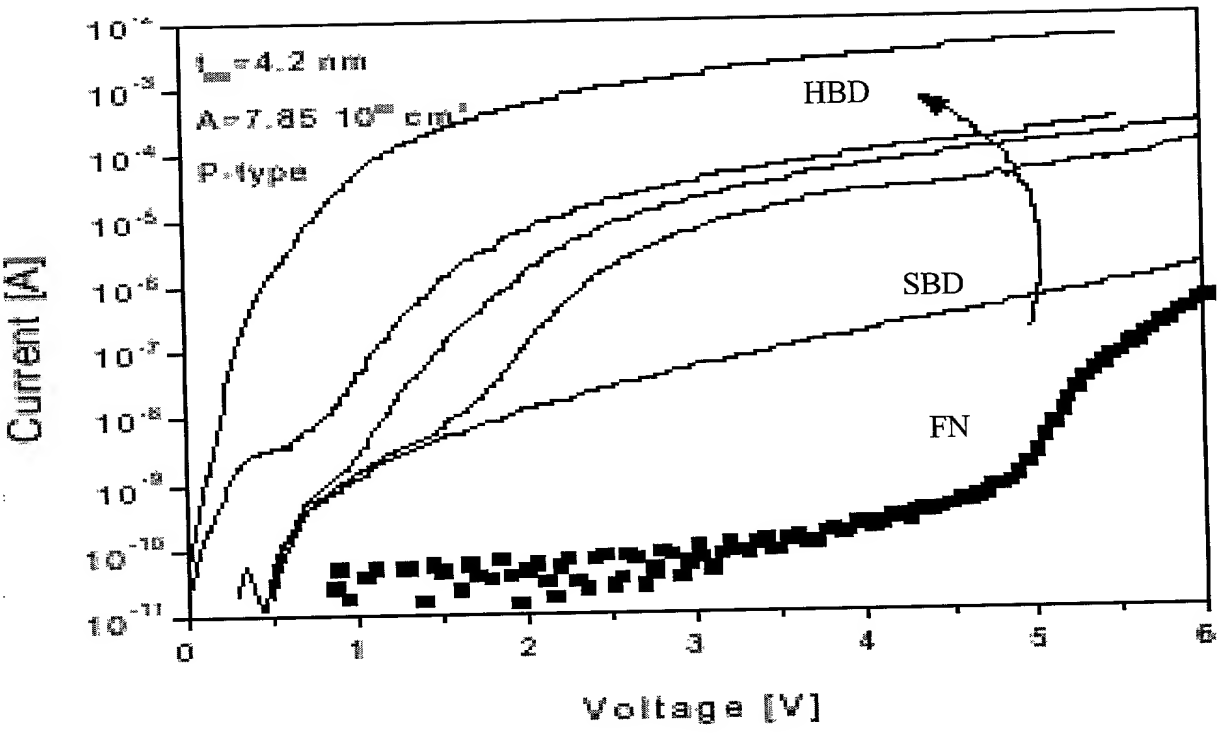
t_{ox}=4.2 nm
A=7.85 10^{-6} cm^2
P-type
HBD
SBD
FN
Current [A]
Voltage [V]
0
1
2
3
4
5
6

FIG. 13

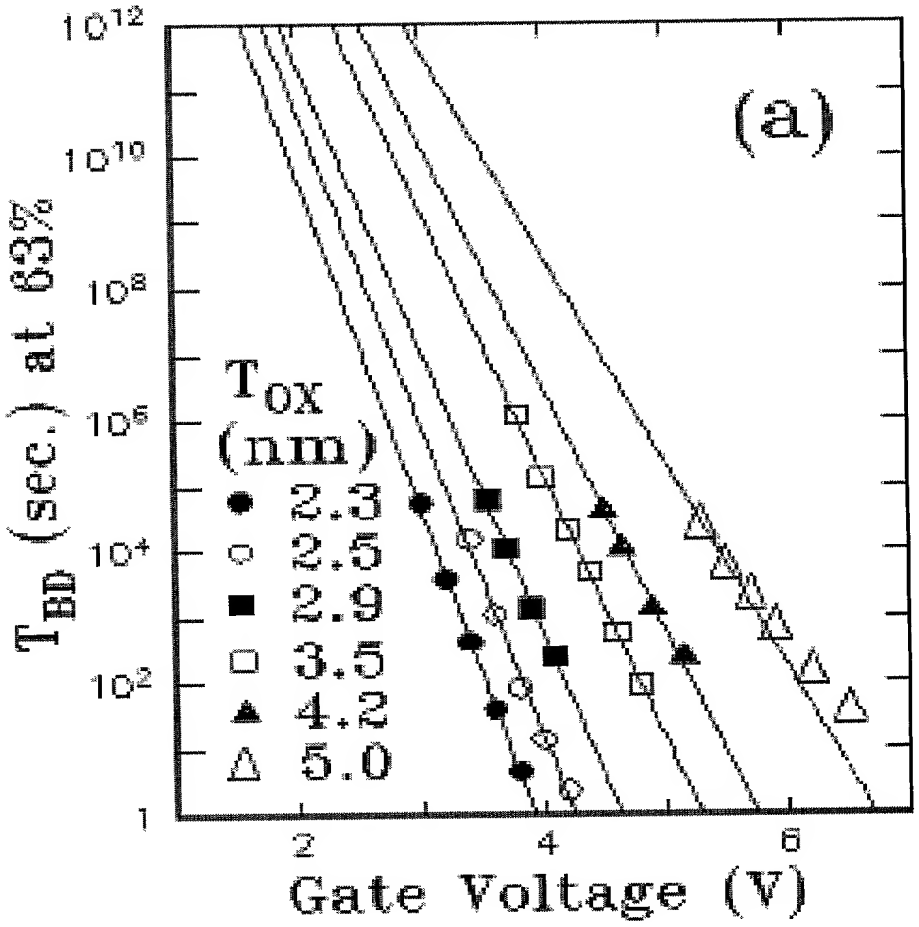
(a)
T_{BD} (sec.) at 63%
10^{12}
10^{10}
10^{8}
10^{6}
10^{4}
10^{2}
1
2
4
6
Gate Voltage (V)
T_{ox} (nm)
2.3
2.5
2.9
3.5
4.2
5.0

FIG. 14

EP 0 975 026 A2

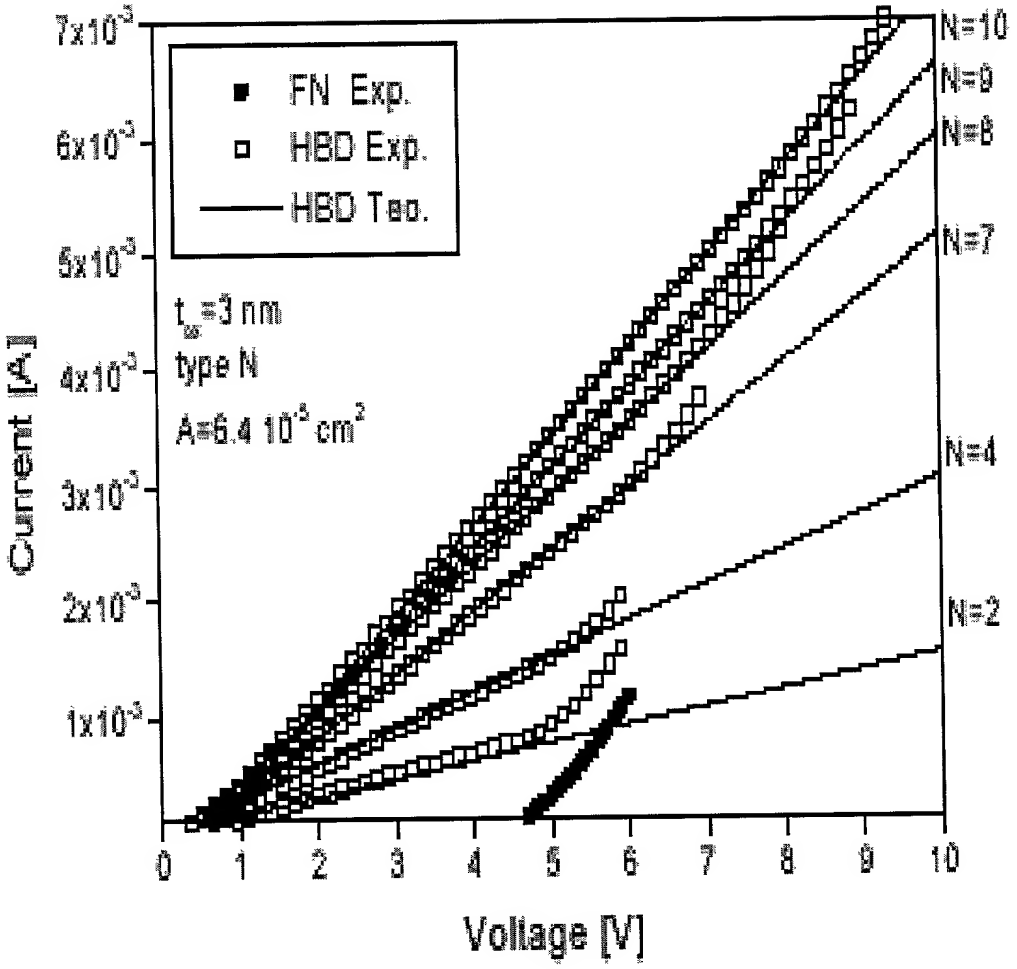

FIG. 15

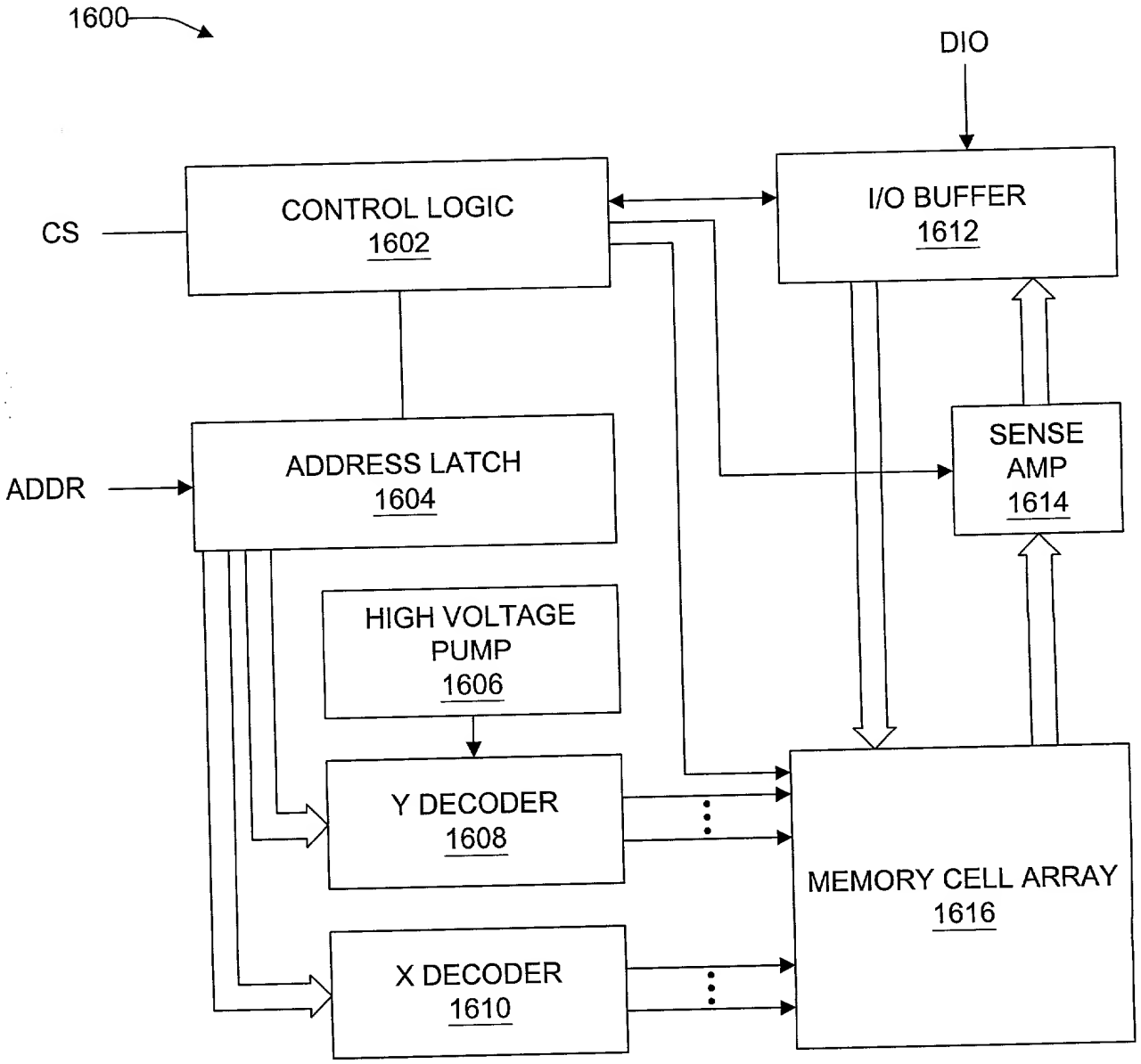
1600
DIO
CONTROL LOGIC
1602
I/O BUFFER
1612
CS
ADDRESS LATCH
1604
SENSE
AMP
1614
ADDR
HIGH VOLTAGE
PUMP
1606
Y DECODER
1608
MEMORY CELL ARRAY
1616
X DECODER
1610

FIG. 16